

- Government models and simulations.
- Integration labs — component development labs, C4ISR System Integration Lab (SIL), platform SILs at partner sites, SOS Integration Lab, and field tests.

### The Path Forward

The challenge of implementing an SoS integration approach for FCS has been successfully met through the Army and LSI partnership. The Army and LSI senior leadership's focus on SoS engineering and integration activities in SDD's early phases ensures that the FCS program is successfully integrated with the UA, UE and JIM forces. The near-term focus

is to baseline the FCS program to get the whole "One-Team" aligned to a common objective and associated roadmap. Upcoming actions include completing the Integrated Baseline Review Phase I, which will ensure that schedules are integrated horizontally and vertically. The SoS Requirements Review was scheduled for completion in December 2003 followed by the individual IPT SRRs. The One-Team will continue to leverage partner expertise in developing the SoS integration approach.

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## Future Combat Systems and the New DoD 5000 Acquisition Guidance

COL Donald P. Kotchman



**M**ay 14, 2003, was a significant day for Army transformation: the Defense Acquisition Executive authorized the Future Combat Systems (FCS) program, the largest and most comprehensive development effort for the acquisition of combat capability in U.S. history. Program magnitude and challenges were daunting and the program's complexity surpassed any previous Army developmental effort. Along with tackling the program's scope, Army program managers (PMs) had to address three aspects simultaneously — keeping up with the ongoing requirements definition process revisions, an ongoing update to defense acquisition processes and implementation of a system-of-systems (SoS) management philosophy — as they prepared for a milestone decision run against unprecedented schedule goals.

Combatant commanders encounter near-term strategic capability gaps that may affect the range of land power options needed to operate in today's dynamic security environment to exercise National

Command Authority. In his October 1999 presentation on Current and Future Force Capability, then Army Chief of Staff (CSA) GEN Eric K. Shinseki set the course for Army transformation

when he described the capabilities that would be required of FCS as the centerpiece of the Future Force materiel and doctrinal solution. The Secretary of the Army and the CSA articulated their vision of how the Army would transform to meet 21st century demands in a white paper.

The Director of the Defense Advanced Research Projects Agency (DARPA) and the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASAALT) executed a Memorandum of Agreement (MOA) on Feb. 28, 2000, to establish a collaborative program to develop and define an FCS design concept. Simultaneously, the U.S. Army Training and Doctrine Command (TRADOC) worked with the Army staff to construct Future Force

concepts of operation. This MOA initiated the DARPA-led Concept and Technology Development (CTD) phase of the FCS program. CTD provided for the evaluation and competitive demonstration of FCS-related technologies and helped to:

- Define and validate FCS design and operational concepts using modeling, simulation and surrogate exercises.
- Demonstrate the concept was suitable for transition to the System Development and Demonstration (SDD) phase.
- Develop selected enabling technologies for integration into FCS.

In executing the CTD strategy, DARPA used a new contracting methodology known as an other transaction agreement (OTA), which is simpler and shorter than a procurement contract. In March 2002, DARPA competed the second leg of CTD and selected a Lead Systems Integrator (LSI) to maximize the program's flexibility and to facilitate the SoS approach to developing combat capability.

## Determining the Requirements

The FCS-equipped organization will be organized, manned, equipped and trained to be more strategically responsive, deployable, agile, versatile, lethal, survivable and sustainable than today's forces. The Army formed a triad consisting of the PM, TRADOC and LSI to concurrently work all aspects of requirements development from analysis of alternatives, to deriving technology requirements and, finally, balancing technical feasibility with capabilities in a time-phased or "evolutionary" approach. FCS capability requirements were derived from the top down, structured around an organization

steeped in joint interdependencies, reliant upon intra- and interoperability for success and focused on achieving full-spectrum combat dominance in a significantly expanded battlespace.

## Important Feedback

Timely feedback of cost, schedule and performance implications enabled the triad to develop these requirements at speed, but not in haste. Feedback further enabled the triad to formulate plans for analyses and trade studies for those requirements that would need

comparison of changes and prioritizations — with quick printing of high-quality documents. TRADOC then framed the requirements document in segments that facilitated easy visualization of the family-of-systems (FoS) in a unit of action (UA) structure, which is the basic organizational building block for the Future Force. This operational requirements document (ORD) structure relied on the base document to list primary SoS requirements, while annexes list platform and system requirements.



TRADOC conducted workshops, which included all stakeholders, to examine the integrated concepts that define the major aspects of the force. These workshops allowed for the identification of requirements at a time when all the stakeholders were present to ensure full understanding and buy-in. These same principles of teaming, concurrency and distributive collaboration will remain in place as the "One-Team" concept while Army completes the SDD in preparation for an initial production decision.

further definition and rationale in the future. Along with the triad, many other stakeholders were encouraged to participate to eliminate future problems early in the generation of requirements, enabling the Army to use its functional expertise in all areas to develop an achievable requirements document and a plan to achieve knowledge for requirements yet unconceived.

## One-Team Workshops

Several techniques were used to lessen the complexity of the distributive work associated with defining an SoS-oriented requirements document. Requirements traceability was emphasized by using a management database as the principal tool to capture requirements. Requirements could now be managed in tabular form — for easy inventory,

## Developing the FCS Acquisition Strategy

Traditionally, the government awards a contract to a single prime contractor to procure a platform or system. The prime contractor builds in its core capabilities and subcontracts the rest of the work. The relationship between the government and its prime contractor has, more often than not, been one of "benign adversaries," a relationship requiring checks and balances to ensure that a system is delivered on time and within budget. Often, as the program moved into the field, new technologies and improvements emerged, resulting in new and lengthy procurement cycles to upgrade the contract's statement of work.

To obtain the best value for the Army, PM FCS uses the LSI as the single accountable, responsible contractor to integrate FCS on time and within budget, ultimately reducing the logistics footprint. The LSI acts on the Army's behalf to optimize FCS capability, maximize competition, ensure interoperability and maintain commonality to reduce life-cycle cost. It is the Army's intent to maintain a single LSI throughout the completion of Increment I development. The LSI is the program integrator and is an integral partner on the DARPA/Army/LSI One-Team. The LSI is responsible for providing the Army direct support in developing and analyzing requirements, developing architectures (operational, systems and technical), leveraging applicable government and commercial activities and resources, and assisting in the identification, selection and procurement of components, subsystems and systems.

FCS is the first Major Defense Acquisition Program structured under the provisions of the new (May 12, 2003) DoD 5000 acquisition guidance. The program is tailoring business strategies to contain only those process requirements that are essential and cost-effective. PM FCS is capitalizing on commercial best-business practices to improve acquisition and sustainment processes and to ensure flexibility to meet continuous concurrent user requirements development and refinement to reach objective FCS capabilities. FCS is using an evolutionary acquisition strategy to mitigate the risk associated with the program's challenging schedule and scale. The program is structured around acquiring increments of capability leading to full Future Force capability. Incremental development of an SoS allows the Army to field capabilities to warfighters faster by producing and deploying systems as their technologies mature.

Increment I will provide the initial capability to the Soldier at full operational capability to enable the UA to fight

effectively according to its operational and organizational (O&O) plan. Subsequent increments will incorporate technologies that have matured since the previous increment of capability was fielded to the UA, and will further enhance the UA's ability to execute missions and respond to new threat countermeasures. The sequence of increments will lead to objective FCS full capability for the warfighter and ensures that the UA can execute its O&O plan to dominate ground combat anywhere. The ORD — now called the capabilities development document — defines objective FCS capabilities to guide program development through the life cycle from Increment I through the remaining increments, leading to objective capability.

### Acquisition Streamlining Initiatives

FCS is a complex, netted FoS that will use evolutionary acquisition to field, develop and upgrade equipment throughout its life cycle. The acquisition strategy focuses on creating program increments of affordable capability on the path to full objective capability. Planning for subsequent increments is dependent on the availability of future technologies, value to the operational concept, affordability and integration considerations. "The success of the strategy depends on the consistent and continuous definition for requirements and the maturation of technologies that lead to disciplined development and production of systems that provide increasing capability towards a materiel concept," (DoD 5000 series). The FCS program has embraced the flexibility offered in the new acquisition policy in two ways.

- Office of the Secretary of Defense (OSD) management has reporting oversight at the SoS level with system management executed per best-business practices via the Army/LSI collaboration.
- OSD partnering occurs through the

integrated product and process development process to maintain integrated insight to the program.

This approach is different from traditional stovepipe oversight arrangements and augments OSD's normal involvement in the DOD overarching integrated product team (IPT), integrating IPT and working IPT process.

Finally, use of an OTA allows the integration of innovative and nonconventional business practices, including Simulation and Modeling for Acquisition, Requirements and Training, among the three primary shareholders — requirements, science and technology and acquisition — thus providing unprecedented flexibility to adjust the program as it matures.

The FCS program's evolutionary acquisition strategy has allowed unprecedented progress in executing its aggressive schedule to develop, test and field an initial operational capability by the end of this decade. It will serve as a model for other acquisition programs to follow as increased attention is placed on innovative, streamlined business practices and sound systems engineering requirements definition and integration activities.

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